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Regional ^{NJ CT}^{NY} **Plan** Association

**An Assessment of the 2005-2009
Capital Needs of the Metropolitan
Transportation Authority**

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EXECUTIVE SUMMARY

The upcoming 2005-2009 capital program for the Metropolitan Transportation Authority (MTA) represents a pivotal period for the ambitious rebuilding agenda begun by the MTA in 1982. The last two decades have witnessed a remarkable turnaround for the region's network of subways, buses and commuter rails. The system that was Exhibit A for a dysfunctional New York in the 1970s is now a leading symbol of its success in the 1990s and its resilience following September 11. Yet this very success may be the biggest impediment to implementing this and future capital programs. After investing \$52 billion in 22 years, there is a danger of false complacency. **This would be a grave mistake for the city and the region. Continued rebuilding is vital. A return to disinvestment will result in gradual erosion of this asset and a lost opportunity to support a changing, expanding economy.**

The challenges facing the MTA and the region are daunting. We must:

- **Continue the State-of-Good-Repair effort even as the MTA ramps up regular investments in normal replacement.** Although many parts of the system, particularly in New York City's subway network, are not projected to reach a state of good repair for several years, rolling stock, tracks and facilities still need to be replaced and upgraded on a regular basis. According to the MTA's 2000-2019 Needs Assessment, normal replacement will increase from about 37% of the Transit Authority's expenditures on existing facilities in 2000-2004 to 61% by 2010-2014.
- **Build both a Second Avenue Subway and LIRR-Grand Central connection (East Side Access).** To see service implemented on these projects by

2011 and secure billions in federal dollars, substantial state resources need to be committed in 2005-2009.

- **Move away from an unsustainable reliance on debt financing for transit rebuilding.** Borrowing and debt refinancing accounted for 59% of the 2000-2004 capital program, contributing to growing operating deficits that can only be addressed through some combination of subsidy, fare increases or service cuts. Debt financing will need to be greatly reduced in the 2005-2009 program if the MTA's fiscal health is to be restored.

The economic importance of meeting these challenges is immense. Since the state of good repair effort began, improved mobility and increased ridership have made possible economic expansion that has added nearly 700,000 jobs to the MTA region. Failure to maintain a well-functioning system would put a foundation of continued prosperity at risk.

Even with these improvements, congestion in the region has increased and New York faces a growing competitive challenge from other regions that are investing in their transportation systems. In an era when quality of life is of paramount importance for attracting a talented workforce, the New York metropolitan area has the longest commutes in the nation and commuting times worsened in the 1990s. Cutting edge mass transit made possible the concentration of talent and energy that made New York the world's leading 20th century city. State-of-the-art mass transit is an essential prerequisite if New York wants to maintain that preeminence in the global century that is now beginning. That will require an unprecedented threefold effort.

Maintaining and Upgrading the Current Network
The MTA will require at least \$18.9 billion
between 2005 and 2009 to maintain sufficient
progress on its State of Good Repair, Normal
Replacement and System Improvement goals.

The MTA's 2000-2019 Needs Assessment projected a need for \$15.2 billion in 2000-2004 and \$16.2 billion in 2005-2009 to meet system-wide goals for subways, buses and commuter rails. Adjusting for inflation, and including bridges and tunnels, these targets would be approximately \$17.9 and \$19.8 billion, respectively, in 2003 dollars. The 2000-2004 program was funded at about 80% of the level recommended in the Needs Assessment, and the shortfalls were concentrated in a few areas. Additional funds were later added for repairs and security measures following September 11, but this did not affect funding for state of good repair and normal replacement targets.

The \$18.9 billion recommendation assumes that program areas that were adequately funded in 2000-2004 should be funded at 80% of the projection in the Needs Assessment. Programs that were budgeted well below the Needs Assessment in 2000-2004 should receive this amount and make up for the shortfall in the last plan. In addition, some security and system improvements need to be included.

Four program areas that are critical to safety, system reliability or customer service were funded 25% or more below recommended levels in 2000-2004, all in the New York City Transit Authority. These should receive additional support in the 2005-2009 program:

- **Communications and Signals** was budgeted at \$483 million less than identified in the Needs Assessment, delaying the day when trains can pro-

ceed with greater speed and riders will have real time information on train arrivals and service disruptions.

- **Power Substations** was budgeted at \$685 million less than recommended in the Needs Assessment, leaving the system vulnerable to power outages due to voltage surges, short circuits and other events.

- **Line Equipment**, particularly tunnel lighting and ventilation, was budgeted at \$668 million less, creating potential problems for emergency response and evacuations.

- **Passenger Stations** was budgeted at \$639 million less, limiting progress on rehabilitating stations.

In addition to these considerations, the \$18.9 billion target also includes other priorities to upgrade services:

- **Security projects:** Following September 11, the MTA has implemented approximately half of \$1 billion in recommended improvements for system security. The 2005-2009 program should include funding for the remaining \$400-500 million.

- **Third track of the Long Island Rail Road:** This improvement is essential to enhancing capacity for the growing demand for travel within Nassau and Suffolk counties. Funding to complete a substantial portion of the \$664 million project should be included in this capital plan.

- **Bus Rapid Transit:** New York City and the MTA are about to embark on an 18-month study

that will lead to five projects (likely one in each borough) that will create new premium bus service. BRT strategies include giving buses their own right-of-way by speeding the boarding process. This \$75 million pilot project will test this promising strategy for greatly improving bus travel times.

- **High-Speed Tolls:** High speed tolls at bridges and tunnels, such as those already in place or now being installed around the region on the Garden State Parkway, the New Jersey Turnpike, the New York State Thruway (Tappan Zee Bridge) and at Port Authority bridges will speed traffic, create increased capacity, promote safety, and reduce pollution. The project requires \$20 million apiece for high speed toll lanes at the Verrazano-Narrows Bridge, the Throgs Neck Bridge and the Bronx-Whitestone Bridge.

**NETWORK
EXPANSION**

The 2005-2009 program should include \$7.6 billion to provide new capacity to the transit system. In spite of a 50% increase in the region's population and an 80% increase in employment, there have been no substantial additions to the rail transit network in over 60 years. This failure to modernize and expand the transit system has resulted in inherent problems that can only be addressed through investment in new service. The transit network will soon exhaust its capacity to deliver additional workers to the Manhattan Central Business District, impeding growth in the region's economic engine. The system is also riddled with poor connections, such as the lack of Long Island Rail Road service to Grand Central Terminal, commuter rail service and adequate capacity from Brooklyn to Lower Manhattan, and of direct connections from parts of Brooklyn and

Queens to Manhattan East Side job locations, all problems reflecting the dramatic changes in settlement and employment patterns over the last 60 years that a 1930s transit network cannot address.

With the MTA having obtained federal approvals and nearing completion of engineering and design for both the Second Avenue Subway and East Side Access projects, the first priority of the expansion program should be to implement service as quickly as possible. Since East Side Access will increase demands on the Lexington Avenue subways, it is also critical that these projects proceed simultaneously.

\$3.8 billion should be committed to the Second Avenue Subway to implement initial service by 2009 and begin construction of the second phase. \$2.8 billion is needed to complete the initial operating segment with service from 57th Street to 96th Street. Currently projected to be completed by 2011, this phase should be accelerated and work should begin on future phases by adding \$1 billion. Otherwise, the full Second Avenue Subway project will not be completed until 2020, greatly delaying potential benefits to both Northern and Lower Manhattan and synergies with projects such as the #7 line extension and possibly a connection to Brooklyn, Jamaica and JFK airport via Lower Manhattan. By accelerating the construction schedule, the economic benefits will be realized sooner and the project will be less likely to be curtailed over its long construction period.

East Side Access should also receive \$3.8 billion in the 2005-2009 capital program. This will provide nearly 80% of the \$4.8 billion needed to complete the project. An additional \$1 billion will be needed in the next capital program to

implement service by 2012, as currently intended.

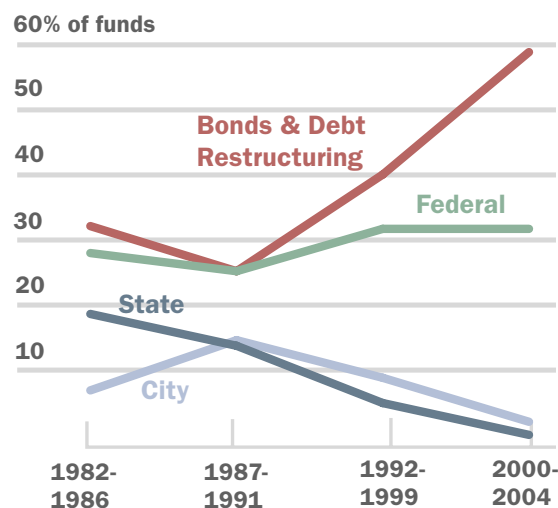
Lower Manhattan Rail Link and #7 Extension

The proposed tunnel linking Lower Manhattan to the Long Island Rail Road and John F. Kennedy Airport would be a worthwhile project – with benefits for the East Side, Brooklyn, Queens and the Bronx, in addition to Lower Manhattan and Long Island – if connected to the Second Avenue Subway. It cannot be fully evaluated or weighed against other priorities until an Environmental Impact Statement is completed, a process that is expected to take two years. RPA looks forward to working with proponents to shape this project.

The extension of the Number 7 subway has been proposed as part of the City and State plan to redevelop the Far West Side. Since New York City has indicated that this can be self-financing, it is not necessary to require any MTA money for this project.

FINANCING The MTA will need approximately \$2.5 billion per year for core program needs and up to \$1.1 billion per year for expansion. Combined, the recommendations for investments in the current network and expansion projects total \$26.5 billion for 2005-2009. Of the \$18.9 billion for state of good repair and normal replacement, about \$6.4 billion can be expected from federal subsidies, MTA program income and asset sales. The remaining \$12.5 billion (\$2.5 billion per year) will need to come from state and local subsidies, bonding backed largely by farebox revenues, or new revenue sources. Similarly, the \$7.6 billion in expansion can count on anywhere from 25-50% funding when the TEA-21 federal transportation bill is reauthorized. This would leave an annual funding gap of between \$760 million and \$1.1 billion.

In developing a financing strategy it is important to address two facts. First, the annual funding need will not end in 2009. **Both the core program and expansion projects will require annual appropriations of at least these amounts for the foreseeable future, so financing needs to provide recurring sources of revenue.** Second, the capital program's reliance on debt has soared while state and local subsidies have declined dramatically. As shown below, while state and local subsidies provided nearly 30% of program costs in the 1980s, they declined to 2% for New York City and 0% for New York State in the last capital program. The MTA's internal cash resources also declined dramatically since the late 1980s, resulting in a greater share of funds coming from bonds and debt restructuring.



MTA Capital Plan Funding Sources

The MTA will need to improve efforts to manage costs and develop more efficient ways to deliver this program. Beyond efficiencies, these realities clearly point to several guidelines for the debate over how to finance the program:

- **New York State, New York City and the suburban counties will need to substantially increase their support with dedicated revenues for state of good repair and normal replacement.** With no likelihood for debt refinancing and limited capacity to absorb additional debt, it will be impossible for the MTA to fund a capital program that even approaches the level of need without increased state and local subsidy.
- **Debt financing and the operating deficit need to be considered concurrently, and the state has to commit to long-term subsidies to rationalize the MTA's financial structure.** Debt financing cannot be avoided entirely for this plan, but it needs to be limited and incorporated into a strategy to resolve the operating deficit. This strategy will need to include increased and sustained levels of state subsidy and reasonable levels of fare and toll revenues.
- **New, dedicated revenue sources will be needed for expansion projects.** These projects, which will expand the economy and tax revenues, should logically be funded with sources that would be dedicated to them for the life of the construction period. This will minimize competition with funding sources for operating revenues and state of good repair. It will also eliminate the risk that partially completed projects will need to be abandoned if funding needs to be cobbled together with each five-year capital plan.

MTA Capital Assessment Report

INTRODUCTION

The Metropolitan Transportation Authority (MTA) will soon release a draft Capital Program for 2005-2009. Unlike previous five-year capital plans, the MTA is releasing a draft program several months before a final program is submitted to the MTA Board for approval. This expanded process allows for greater public examination of the plan's assumptions, scope and priorities. The draft will also trigger an intense debate over how to finance much needed improvements to the region's transit network in a period when the MTA is also facing growing operating deficits.

There will be many issues competing for public and legislative attention for the remainder of 2004, including education finance, Lower Manhattan and plans for Manhattan's Far West Side. The MTA's 2005-2009 Capital Program deserves an equal level of attention. The New York region's unparalleled transit network is a foundation of our economic success, but it is becoming increasingly outmoded. Unless we make the right investments now, we risk losing one of our most important competitive advantages in a rapidly changing 21st Century global economy.

The next five years will be critical to the future success of the transit network in three respects. First, the tremendous progress of the last twenty years in getting the system to a state of good repair (SOGR) is far from complete. Much of the New York City Transit Authority network, including electric power substations, passenger stations and tunnel ventilation and lighting, is still years away from achieving this standard, and must be maintained in good repair thereafter. Second, the MTA has begun long-overdue measures to modernize and expand the system. Halting or slowing progress on initiatives such as the Second Avenue Subway, East

Side Access or automating train supervision would preclude major improvements in the capacity and efficiency of a system that was designed and built for the New York of the early 20th Century. Finally, the MTA's last capital program was so heavily leveraged with debt that its long-term financial stability is seriously impaired.

The fiscal realities facing the MTA, New York State, New York City and the other counties in the MTA region will make it impossible to completely resolve these challenges in the next five year capital program. However, sufficient progress needs to be made toward all of these objectives—SOGR, modernization/expansion and financial stability—to keep the system from slipping into a long-term cycle where it becomes impossible to keep up with both the needs of transit riders and rapidly improving transportation systems in other world cities.

In this respect, the MTA's 2005-2009 capital program should be seen as the start of a transition from successfully returning the system to a state of good repair to committing the resources for its ongoing maintenance and modernization. Although the first task is not yet finished, the other tasks cannot wait. The parts of the network that are in good repair will require comparable levels of investment to keep them functioning efficiently. Modernization and expansion will also consume an increasing share of the capital budget in the coming decades, and we need to create a financial structure that can support these multiple objectives.

This report was prepared by Regional Plan Association (RPA) to help the region examine the MTA's proposed capital program in this broader perspective. Specifically, it is intended to achieve two objectives. First, it suggests benchmarks to

help evaluate the scope and content of the plan. These benchmarks cannot substitute for a detailed analysis of the plan and its rationale, but they can provide a starting point based on analysis of past plans and needs assessments. Second, it recommends some strategic directions for financing the plan. Until the full scope of the plan is known and debated, it is premature to recommend specific revenue sources. However, it is not too early to debate the types of reforms that will be needed to resolve long-term structural problems in both operating and capital budgets.

**CONTINUING NEEDS:
MAINTAINING
AND UPGRADING
THE SYSTEM**

The MTA launched the first five-year capital program in 1982. The system at that time was in a state of emergency. Track fires and service disruptions were commonplace, the subways were considered unsafe at night, subway cars were covered in graffiti and stations were dirty. The capital program was an effort to reverse a near-complete breakdown of the New York region's public transportation system. The first two capital plans focused on bus and rail car fleet replacement and overhaul, mainline track improvements, facility and station renovations.

Since that time the MTA has invested over \$34 billion in state of good repair projects. As a result, major portions of New York City Transit Authority (NYCT) and almost all Metro North (MN) and Long Island Railroad (LIRR) assets

have been brought to a state of good repair. Bridge and Tunnel facilities could not be comparably evaluated from available documents. Service reliability and the customer environment have made tremendous strides. Between 1982 and 1991 the average distance between subway car failures was up to 36,413 from 7,100 miles. By 1989 the last vandalized train was taken out of service. Closed circuit televisions were installed system-wide to improve customer security. Electrification of commuter railroad lines facilitated faster and more comfortable service, and ridership spiked as a result. By 1999, one-third of the 468 subway stations were either rehabilitated or in the rehabilitation process and over 7,000 new subway cars were placed into service. The entire bus fleet was replaced during the 1980s and starting in 1995 fleet capacity was increased by almost 800 busses to address an explosive 50% increase in ridership with the advent of free subway-bus transfers. During the mid-1990s, the MTA instituted automatic fare collection system-wide and successfully phased in MetroCard. Today, more than half of all subway and bus trips are taken on unlimited Metrocards and provide greater mobility at discounted cost.

System Goals for 2000-2019

Five years ago, the MTA produced a 20-year Needs Assessment, outlining the agency's goals for the years 2000 to 2019. The last major effort at documenting the agency's long term capital goals was the 1990 report, "MTA Capital Needs & Opportunities, 1990-2011." The 1999 20-year Needs Assessment builds on the structure of that report and uses the same needs categories – state of good repair, normal replacement, and system improvement – to document how the system will

Vandalized trains like this one came to symbolize system-wide disrepair during the 1970s.



Older “Redbird” trains ran on the BMT. The last of the fleet was retired during the 2000-2004 Capital Program.



ects which are meant to improve the customer environment and operating services by, for example, relieving overcrowding, enhancing safety, improving reliability, speeding up fare collection, and providing better passenger communications.

With some degree of detail, the Needs Assessment shows how over twenty years those line items which reach a state of good repair will

change. It provides detail on how the MTA will transition the concentration of capital resources from replacing systems when they are failing to replacing them according to useful-life cycles, and lays out a plan for largely completing the state of good repair effort by 2019. The assessment calls for a substantial program of continuing commitments over 20 years, specifically **\$42.5 billion**¹ to be invested as follows:

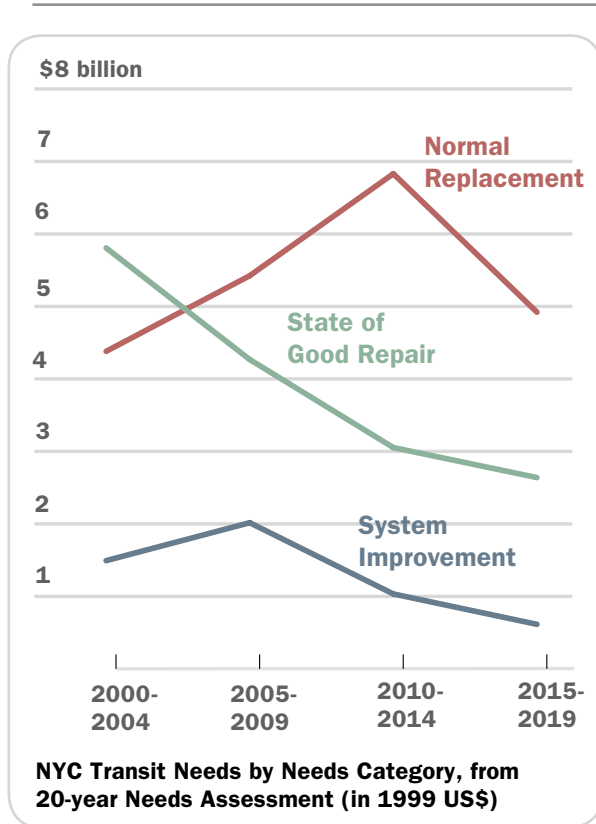
\$15.8 (37%) for state of good repair (SOGR) projects, which rehabilitate track, stations, facilities and rolling stock that have lapsed into disrepair; **\$21.6** (51%) for normal replacement (NR) projects, which maintain good repair by replacing components as they reach the ends of their useful lives (for example, by purchasing new rail cars); and **\$5.2** (12%) for system improvements proj-

move into a normal replacement cycle. The following table shows how that would pan out in terms of investment by needs category. While only 37% of expenditures were projected for NR in 2000-2004, by 2015-2019 these needs were to account for 58% of the capital plan. The data presented are only for the New York City Transit Authority, which makes up 78% of the continuing needs budget (Metro North Railroad comprises 8% and Long Island Railroad 14%). Detail on this scale was only provided for the NYCT; it can be assumed for the railroads that SOGR amounts are fairly low, since most line items are already in a state of good repair. (See chart below and right.)

As of 2000, very few commuter railroad line items were not yet in a state of good repair:

New York City Transit, from 20-year Needs Assessment, in percent

	2000-04	2005-09	2010-14	2015-19
State of Good Repair	49	36	27	31
Normal Replacement	37	45	61	58
System Improvement	12	17	9	7
Other	2	2	3	3



for Long Island Railroad, only line structures remained, and for Metro North Railroad, stations, structures and shops and yards all remained but each was over 80% completed. Many New York City Transit items remain to be restored, however. The specific state of good repair goals for New York City Transit as outlined in the 20-year Needs Assessment and shortly after in the 2000-2004 capital plan are as follows:

New York City Transit Line Item	SOGRTarget Date
215 power substations	2004
All 289 pump rooms	2004
64 passenger stations and all station escalators/elevators	2004
Bus Depots	2005
6 car maintenance shops and 1 overhaul shop	2009
Line structures	2009
66 stations ADA compliant	2010
Yard track and switches	2015
Tunnel lighting	2016
All 318 circuit breaker houses	2016
Fan Plants (ventilation)	2018
All 468 passenger stations	2019
Communications Based Train Control on 1/3 of lines and Automatic Train Supervision capability on all lines	2019
100 stations fully disabled accessible	2020

The interior of New York City Transit's new R143 and R160 subway cars.

Accomplishments of the 2000-2004 Capital Plan

In 2000, the MTA announced that, after 18 years of system restoration, the agency was ready to take the next step and physically expand its transportation network. In addition to nearly \$15 billion for continued state of good repair and maintenance work, the 2000-2004 capital plan committed \$2.5 billion toward East Side Access and the Second Avenue

Subway. After September 11, additional funds were committed to build a Fulton Street Transit Center, redesign South Ferry Terminal, and complete a number of security projects, bringing the total cost of the amended 2000-2004 plan to \$20.1 billion.

Significant achievements will likely be outlined in the forthcoming 2005-2009 plan, and will include retirement of the old "redbird" fleet and purchasing thousands of new subways cars (\$1.9 billion commitment), buses (\$576 million commitment), and electric cars for the railroads (\$1.5 billion commitment); rehabilitating dozens of sta-

tions and making many of them ADA compliant (\$1.9 billion commitment); and – on the network expansion side of the plan - completing the engineering and design work necessary to launch construction of East Side Access and the Second Avenue Subway.

Capital commitments have tracked the original plan reasonably well. The 2000-2004 capital plan was approved by the capital program review board in 2000. A number of amendments have been made since then, the most recent being in December 2003. The table below shows that the core items of the capital program did not deviate



2000-2004 Plan to Program Comparison (except where noted, in millions of \$)

	State-of-Good-Repair		Normal Replacement		System Improvement		Other		Total	
	1999 Plan	Dec. 03 Amended Plan	1999 Plan	Dec. 03 Amended Plan	1999 Plan	Dec. 03 Amended Plan	1999 Plan	Dec. 03 Amended Plan	1999 Plan	Dec. 03 Amended Plan
NYCT	4,552	4,547	3,984	3,780	1,548	1,464	97		10,181	9,790
LIRR	37	28	1,910	1,870	105	192	95	89	2,147	2,179
MNR	166	155	928	901	177	272	51	77	1,322	1,405
Total	4,755	4,729	6,822	6,551	1,830	1,928	243	166	13,650	13,374
Share(%)	35	35	50	49	13	14	2	1	100	100

much from the originally approved plan. However, changes made to the capital plan due to necessary reconstruction and federal funding after September 11, 2001 are not included here. They are in a separate category, as are network expansion projects, bridges and tunnels, and planning and customer service.

Lagging Program Areas

The 2000-2004 capital program committed over \$13 billion toward these state of good repair, nor-

mal replacement and system improvement goals, or about 20% less than recommended for those years in the 20-year needs assessment. The 20% shortfall was mainly due to lower levels of investment in New York City Transit; Metro North and Long Island Railroads were funded at close to the needs assessment recommendation. Progress toward the aforementioned state of good repair goals is not known. However, the funding shortfall was concentrated somewhat more in state of good repair projects (29%) than in normal replacement (22%) or system improvements (11%).

Given less funding than required to meet the goals outlined in the Needs Assessment, the MTA was required to make choices on where to concentrate investments. Nearly all line items received less than they would have under the Needs Assessment, but many, such as subway and commuter rail cars, buses and tracks, were funded at close to the recommended level.

However, a few line items stood out as both substantially underfunded and crucial to the MTA's strategic priorities. Five line items—communications and signals, power, line equipment, shops and yards and passenger stations—were more than \$400 million and more than 25% lower than recommended in the Needs Assessment. Bridge and Tunnel line items could not be evaluated because they were not included in the 20-year Needs Assessment. RPA evaluated these items by the MTA priorities: (1) to maintain and improve service reliability, (2) to enhance the customer environment, (3) to improve or expand service, and (4) to improve customer and employee safety and security. Four of the items were judged to be particularly important to these priorities and should be candidates for increased funding in the next capital program:

Comparison of 2000-2004 Amended Plan to Needs Assessment (in millions of 2003 \$)

		Dec. 03 Amended Plan	2000 to 2004 Part of Needs Assessment	Difference (%)
State of Good Repair, Normal Replacement and System Improvement	NYCT	9,790.3	12,899.5	-24
	MNR	1,327.4	1,355.2	-2
	LIRR	2,090.6	2,227.7	-6
	MTA Total	13,208.3	16,482.4	-20
	Bridge & Tunnel	1,028.8	N/A	
NYCT, by needs category	State of Good Repair	4,546.8	6,413.2	-29
	Normal Replacement	3,779.9	4,837.6	-22
	System Improvement	\$1,463.6	1,648.8	-11
	NYCT Total	\$9,790.3	12,899.5	-24

Communication & Signals was budgeted for \$483 million less than identified in the Needs Assessment. The subway system still uses wayside signals (the stoplights on the side of the tracks) and fixed block tracks to electrically detect trains. While most of this system is in a state of good repair and safe, it is beyond its useful life and inefficient compared with newer systems. No major advances have been realized since 1904. Trains still have to be a certain distance apart, regardless of demand. The system is supposed to transfer completely to communications based train control (CBTC) by 2019.

The current, old system safeguards trains but limits throughput. CBTC allows for more trains to be run on the existing system (closer spacing; “moving block”); increases safety and flexibility in operations for faster recovery from unforeseen circumstances; faster trips; greater reliability; and more timely information. From the customer’s perspective, this means less time waiting on the platform between trains, more reliable train schedules and less crowding.

Automatic train supervision (ATS) centralizes control of train movements. It tracks and displays train locations, identities, vehicle numbers, and schedules. The CBTC-ATS system will support computer-aided automatic routing and dispatching functions, and will monitor, report on, and control the performance of all trains in relation to variance from schedule and/or headway. Riders on lines which are upgraded to the new system will receive accurate real-time information on train arrivals and route changes, decreasing the impacts of delays and disruptions.

ATS gets installed as an overlay to existing signals on lines with newer fixed-block signals. On lines scheduled for signal replacement, CBTC

will be installed. The normal replacement of the fixed-block signaling with CBTC signals will begin in the 2005-09 Capital Program, with lines prioritized based on signal age and the need for increased service capacity.

Power was budgeted for \$685 million less than identified in the Needs Assessment. The MTA still needs to bring remaining power substations into a state of good repair and adequately fund the normal replacement cycle. Substations power the subway system by converting AC to DC. Substations need to be modernized and rehabilitated to ensure safety and system reliability. Modernization includes new equipment (solid state silicon diode power rectifiers) which will protect against voltage surges and internal short circuits. Other items are emergency alarms and cable replacement – if these are left undone, major parts of the system can be shut down causing service disruptions, delays, overcrowding and an overall deficit of system reliability.

Line Equipment was budgeted for \$668 million less than in the Needs Assessment. Line equipment is important to worker safety and is also crucial during cases of fire, flooding, and tunnel evacuations. The item includes electrical and mechanical equipment along the right-of-way throughout the system, specifically ventilation, lighting, pumps and circuit breakers. Ventilation plants control airflow in tunnels and mitigate the effect of smoke conditions in tunnels; clearly ventilation has implications for emergency situations and worker safety. There are 202 ventilation plants in the system, and approximately 57% of them were in a state of good repair as of 1999. Tunnel lighting supports emergency response activi-

ties, especially if train evacuations are necessary. The system has 417 track miles of tunnel lighting; as of 1999, 48% of it was in a state of good repair. Right now tunnel lighting is being brought to a state of good repair according to demand for tunnel access. While this makes sense from the perspective of worker safety, it does not prioritize emergency response. Pumps – located at low points throughout the subway system – remove water that collects in the tunnels from storm runoff, groundwater and water main breaks. This line item includes pumps and discharge lines, emergency power, an automatic alarm system and equipment to enable remote monitoring. Again, there are implications for emergency response and worker safety.

Passenger Stations were budgeted at \$639 million less than the Needs Assessment. Station selection for rehabilitation is according to established criteria that accounts for structural condition, usage, and other factors. Rehabilitation often entails:

- Replacing incandescent station lighting with vandal resistant fluorescent lighting.
- Improving signage in stations throughout the system.
- Installing closed circuit television cameras (CCTV) along curved station platform edges to improve the safety of passengers as they enter and exit trains.
- Improving or creating new transfer and intermodal facilities.
- Improving stairways for better transfer passenger circulation.
- Replacing and installing new escalators and elevators.

- Making stations fully accessible in accordance with ADA standards (100 stations by 2020 and two-thirds of those compliant by 2010). This includes work on platform edges, signage, lighting, handrails, elevators and/or ramps and other required elements.

Station escalators were due to begin normal replacement schedules during the 2000-2004 program. Escalators with a life expectancy of 12-15 years were to be replaced with more durable units with external drives to improve reliability and reduce the amount of time that escalators are out of service for maintenance. In addition, an expanded, high-speed fiber optic network was to be accessible for all the agency's communication needs that terminate in stations, such as station agent booth communications and the automated fare collection system. Upgraded public address, customer information screens, and closed-circuit television were to be linked with the network so the agency could provide real-time information to customers. The 2005-2009 capital plan should report on the progress of these two items.

System Improvement Priorities for 2005-2009

In addition to increasing funding for lagging program areas, the 2005-2009 plan should also fund a number of improvement projects with high potential to benefit the public in the near future. The following items include projects for which the need has increased over the last several years, or which capitalize on new technologies.

Bus Rapid Transit (BRT): \$75 million

The City and MTA are about to embark an 18-month study that will lead to five projects (likely one in each borough) that will need some imple-

mentation funds. New York City buses, many traveling as slowly as 7.5 miles per hour, are the slowest in America. Slow bus service contributes to very long travel times to work in New York City, as shown by the latest census². Traffic congestion is clearly a major factor, as are delays from inefficient boarding and exiting, suboptimal traffic signal timing, and lack of real-time fleet management tools. BRT is a promising strategy for improving bus service. This can be done by giving buses their own right-of-way, as rail now does, with better markings and enforcement, speeding the boarding process and priority at traffic signals. BRT has been applied successfully in major cities including Los Angeles and Vancouver, British Columbia as well as cities in South America, Europe and Australia, where it has been shown to speed up buses significantly, providing better service for the customer and saving operating costs for the operator.

Third Track on LIRR: \$332 million

This is a \$664 million project, to be constructed over two capital programs, to construct a third track along the LIRR Main Line, roughly from Jamaica to Hicksville, including a separation of up to five grade crossings. Without this improvement, the LIRR has limited capacity for reverse commutes in the peak hours. This constrains travel within Nassau and Suffolk, which is the most rapidly growing segment of the commuter market. A coalition has formed to advocate this project which includes Citizens Committee for Civic Action, Environmental Defense, Health and Welfare Council of Long Island, Long Island ACORN, Long Island Association, Long Island Mid Suffolk Business Alliance, Long Island Progressive Coalition, Long Island

Regional Planning Board, New York League of Conservation Voters, Permanent Citizens Advisory Committee to the MTA, Regional Plan Association, Sustainable Long Island, Tri-State Transportation Campaign, and Vision Long Island.

High Speed Toll Lanes on MTA Bridges and Tunnels: \$60 million

The case for the MTA to begin installing high speed toll lanes on their bridges and tunnels has been ably made in the Tri-state Transportation Campaign's report "The Open Road: The Region's Coming Toll Collection Revolution". High speed tolls will create increased capacity, promote safety, and reduce pollution. The MTA will save money through lower maintenance costs and the regional economy will benefit as commuters and commercial drivers experience reduced gridlock. The project requires \$20 million apiece for high speed toll lanes at the Verrazano-Narrows Bridge, the Throgs Neck Bridge and the Bronx-Whitestone Bridge.

Security Projects: \$500 million

Following September 11, 2001 the MTA undertook a thorough analysis of the system's security needs. Approximately \$1 billion in needed improvements were identified, and funds were added to complete about half of the projects, mostly with new federal funds. Completion of the remaining projects should be a priority in the next plan.

Recommended Funding for 2005-2009

Using the 1999 20-year Needs Assessment as a benchmark for the 2005-2009 program has its limitations. It does not provide the detail necessary for a full evaluation of line items, and priorities

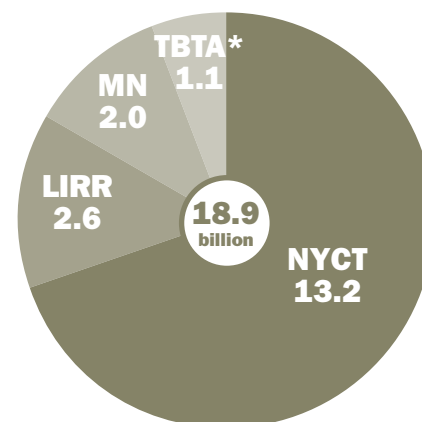
²The average commute time for Manhattan workers is 48 minutes. US Census of Population, Public Use Microdata Series 2000, RPA calculation

may have changed since the Assessment was written. RPA eagerly awaits the MTA's draft five-year plan to make a more detailed assessment. Ideally, however, these core program objectives—State of Good Repair, Normal Replacement and System Improvements—would be funded at the level projected for 2005-2009 in the Twenty-Year Needs Assessment, plus additional funding for line items that lagged in 2000-2004 and new system improvement needs. This full program would require \$22.3 billion. Some lower priority projects can probably be deferred. However, cutting too deeply below this level could seriously impede safety, system reliability and customer service. Making the detailed, project-by-project determinations is something that the MTA should provide with their draft 2005-2009 plan. The following recommendations are offered to provide some reasonable benchmarks for evaluating the plan when it is released:

- For line items that were funded at or near levels projected by the Twenty-Year Needs Assessment in 2000-2004, funding should average 80% of Needs Assessment targets in 2005-2009.
- The four line items described above—Communications and Signals, Power, Line Equipment and Passenger Stations—should receive additional funding equivalent to 80% of the difference between the Needs Assessment and the commitment for 2000-2004.
- The program should include the service improvement priorities described above.

These recommendations would result in a total of \$18.9 billion to maintain and upgrade the existing MTA transit network. By agency, planned expenditures would be distributed as follows:

Recommended 2005-2009 Funding for State of Good Repair, Normal Replacement and System Improvement Capital Items



***Need for Bridges and Tunnels may be underestimated. \$1.1 billion comprises the amount committed in the last capital program plus \$60 million for high-speed tolls.**

This amount is slightly lower than the amount recommended in the Needs Assessment for 2005-2009: \$19.9 billion in 2003 dollars. This figure inflates the \$16.2 billion target (1999 dollars) for NYCT and the railroads to \$18.7 billion (2003 dollars) and adds \$1.1 billion, the amount in the 2000-2004 capital plan, for Bridges and Tunnels. Since funding for the last capital program was significantly below the level needed to attain a system-wide state of good repair by 2019, continued underfunding of basic repairs, replacement and upgrades will keep pushing this goal into the future and risk erosion of the gains that have been made in the previous two decades.

EXPANDING THE TRANSIT NETWORK

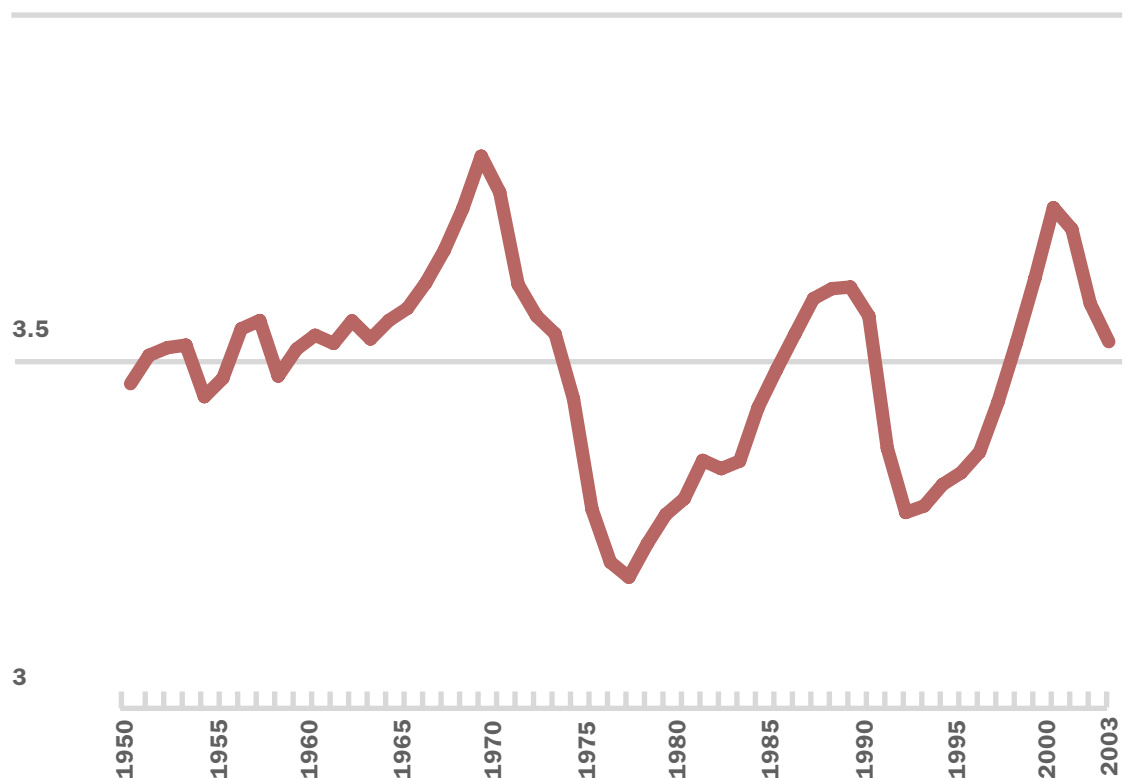
The rail transportation network in the New York metropolitan region—including MTA subways and commuter railroads, New Jersey Transit and the Port Authority’s PATH system—has not been expanded in more than 60 years. By any measure—miles of track, number of riders, geographic reach—the system easily surpasses every other transit system in North America and has few peers among world cities. However, this system was designed for the New York of the early 1900s, a much smaller region with simpler commuting patterns. In fact, since the last rail line was completed in 1940, the system has actually shrunk, despite a growth of 50% in the region’s population and 80% in employment.

The failure to expand the transit system has resulted in three inherent problems that can only be addressed through investment in new service: **The transit network will soon run out of capacity to deliver additional workers to the Manhattan**

Central Business District. Any additional commutation into the CBD will need to come from transit riders. Auto vehicles entering the CBD in the morning rush hour peaked in the mid-1980s, and any additional auto trips would only further clog the highly congested arteries into and through Manhattan. Much of the transit network is also at or near full capacity, including the Lexington subway, the express bus network using the Trans-Hudson crossings, and the commuter rail system into Penn Station from both the east (Long Island Rail Road) and west (NJ TRANSIT).

Numerous “disconnects” in the network impede travel times and prevent businesses from fully accessing the regional labor market. For example, neither LIRR nor NJT riders can travel directly to the East Side and Metro North riders cannot go directly to the West Side. There is no

New York City Employment 1950-2003
4 million



direct commuter rail service and inadequate capacity from Brooklyn to Lower Manhattan, and no direct subway service to East Midtown job locations from many parts of Brooklyn and Queens. Many transfer points between subway lines could also work far more efficiently.

Settlement and employment patterns have changed substantially while the rail transit network has remained static. Residential growth in areas that are not well served by transit contributes to growing auto congestion in the region. Employment has also become more decentralized, partly in response to decades of highway expansion. As a result, the transit network has a limited ability to support an increasingly “multi-centered” region.

The result is a system that is not prepared to support a growing metropolitan economy in the next century. In fact, an argument can be made that the lack of transit capacity has contributed to New York City’s inability to grow past the level of 3.8 million jobs since 1969. The city has approached this employment level twice in the last 30 years—once in the late 1980s and again in the late 1990s—only to fall back again. While in both instances the downturns were caused by other factors, growing congestion may have slowed growth in the later years of the expansions.

At best, the inadequacies of the transit network will make it more difficult to compete with other global centers in an era when quality of life, worker productivity and business efficiency are central to economic success. At worst, lack of capacity may be imposing a ceiling on the growth potential of the region’s urban core.

2000-2004: Initial Steps and Building Momentum

The MTA’s 2000-2004 capital program made the first substantial commitments to expanding the transit network since construction of the Second Avenue Subway was abandoned in the 1970s. With \$2.5 billion to complete preliminary design and engineering for East Side Access (ESA) and the Second Avenue Subway (SAS), the MTA began the long overdue effort to create new capacity. In the last five years, several events have reinforced the need to continue, even accelerate, this progress.

Most importantly, the MTA has completed design for both ESA and SAS and obtained federal approvals to proceed with construction. Billions of federal dollars for these projects will be at risk if the region does not provide the remainder of the funding necessary for construction.

September 11 also awakened many public officials, business leaders and citizens on the need to not only rebuild, but to address the transportation deficiencies that have constrained the Downtown economy. As a result, the MTA is committed to creating a new transportation hub at Fulton Street and redesigning the South Ferry station with federal funds. In addition, the Mayor and the Governor have endorsed a new rail tunnel to link the Long Island Rail Road and JFK airport to Lower Manhattan.

The need to create new areas for office and housing development has also prompted proposals to extend the reach of the rail network. In particular, the extension of the Number 7 subway is being promoted by New York City as the key to redeveloping Manhattan’s Far West Side.

A Long-Term Expansion Strategy

While much attention has been given to the need to prioritize these projects, far less has been said about a long-term strategy for the system as a whole. A comprehensive strategy for the region needs to look beyond the MTA region and facilities.

From this perspective, three projects form the core of a capacity expansion program that would address all of the shortcomings described above. In the MetroLink proposal articulated by RPA in 1999, the Second Avenue Subway would form the trunk line for new subway services that would extend into the Bronx, Queens, Brooklyn and JFK airport. East Side Access would relieve congestion from Long Island while Access to the Region's Core (a new passenger rail tunnel from New Jersey to Manhattan) would do the same for trips from west of the Hudson River. All three projects would also better integrate the system, eliminate many of the "disconnects," and better serve hubs outside of Manhattan, including Jamaica, Downtown Brooklyn and the Bronx Hub.

Expansion in this core capacity will insure that other important projects, such as extension of the Number 7 line, can serve particular markets while enhancing increased mobility throughout the network. While building this capacity is a long-term effort that needs to proceed in multiple phases, phasing should not be used as an excuse to abandon critical projects. All need to be built to provide the mobility to compete with other world cities and facilitate a century of sustainable economic growth.

Expansion Priorities for the 2005-2009 Capital Program

For the next MTA capital program, this long-term strategy implies a focus on two projects: the

Second Avenue Subway and the LIRR Connection to Grand Central Terminal (East Side Access). Not only are these projects at the core of relieving congestion and improving connections throughout the system, but the region and the MTA have already committed substantial resources and positioned these projects for construction after literally decades of discussion and delay.

Second Avenue Subway: \$3.8 billion for 2005 to 2009

The MTA is projecting a total \$16.8 billion for completion of the Second Avenue Subway by 2020. In the next capital plan, \$2.8 billion is projected to begin construction on the minimum operating segment with service from 57th to 96th Street with completion expected in 2011. Completing this segment as quickly as possible is critical to begin seeing tangible benefits for a project that has been so long in the making and is still many years from completion. It is also a requirement for having a portion of the project paid for by grants from the Federal Transit Administration.

There is also a strong case for accelerating later phases of the project. The benefits of the full project in crowding relief, time savings, and auto and taxi use reductions will reverberate throughout the East Side, Harlem and The Bronx as well as for Hudson Valley and Connecticut commuters. The project makes Lower Manhattan an attractive employment choice for Metro North riders no longer subject to the crowding and unreliability of the Lexington Avenue subway. And the full-length Second Avenue Subway can also serve as the future building block for services to the Bronx, Brooklyn, Queens, and the Lower East Side. RPA has estimated the value of speeding up the pace of construction of the Second Avenue Subway and of combining phases to establish earlier benefits.

While the total cost would remain at \$16.8 billion, the net present value of the project would be \$2 billion to \$6 billion greater than if we were to continue at the current pace, derived from a faster windfall of benefits to riders.

Therefore, in addition to \$2.8 billion for Phase I, the 2005-2009 program should include an additional \$1 billion to begin construction of the next phase. This would not only hasten benefits for hundreds of thousands of riders. It will also provide greater assurance that the entire project will proceed to completion.

LIRR's Access to Grand Central Terminal (East Side Access): \$3.8 billion

This \$6.3 billion project, to be completed by 2012, requires another \$4.8 billion to complete. It is assumed that nearly 80% of it would be required in the 2005 to 2009 program, the remainder provided in the next capital program. The project has a range of benefits that extend beyond the obvious ones of savings time and transfers for tens of thousands of Long Island commuters. These include higher property values for Long Islanders (as happened in New Jersey with improved commuter rail service), more LIRR use for Queens' residents, reduced subway crowding for trains serving Penn Station, connections between the LIRR and Metro North to facilitate suburb to suburb movement and to JFK Airport, and reduced auto use leading to less congestion and pollution on Long Island and Queens highways.

Other Potential Expansion Opportunities

Long Island/JFK to Lower Manhattan Link

A multi-agency task force recently completed a year-long study of options for improving access

to Lower Manhattan from Long Island and JFK Airport. The study narrowed the potential options to two basic ideas – use of existing tunnels and construction of a new tunnel under the East River. Both of these alternatives will be studied further through an environmental review process that will also consider the many possible alignments and connections for each. It would be a worthwhile project – with benefits for the East Side, Brooklyn, Queens, and the Bronx, in addition to Lower Manhattan and Long Island – if connected to the Second Avenue Subway. Until an alternative is chosen and fully reviewed, it is impossible to know the full cost of the project or its benefits. Any commitment of MTA funds until this review is completed is premature. RPA looks forward to working with the agencies and proponents to shape this project.

#7 Extension

Since New York City has indicated that this can be self-financing, it is not necessary to require any MTA money for this project. The MTA has paid \$46 million of the current studies. The City's payment for the air rights to the yard for construction of the stadium/convention expansion is under negotiation. The MTA should receive full and fair market value that could then be applied to its cash-starved capital program.

FINANCING NEEDS

The recommended program, \$18.9 billion to restore and upgrade the existing network and \$7.6 billion to expand capacity is ambitious, but still substantially less than ideal. The \$26.5 billion total is greater than previous plans, but far from unreasonable considering inflation, increasing

security priorities, the need to maintain normal replacement cycles as more of the system reaches a state of good repair, and the overdue start of network expansion.

In fact, the 2005-2009 capital program should be an opportunity to rationalize the long-term financing of both the basic upkeep and expansion of the system. Both will need to continue at comparable funding levels well beyond 2009. Viewing the financing challenge as a contained five-year problem, rather than one that requires long-term funding commitments, is likely to lead to short-term expediency rather than sound transportation planning or fiscal management. The reality that the MTA's operating budget is also facing large deficits makes structural reform more imperative, rather than less.

The annual funding that will need to be addressed by the MTA, New York State and New York City is illustrated in the tables below.

Of the \$18.9 billion for state of good repair, normal replacement and system improvements, about \$6.4 billion can be expected from federal subsidies, MTA program income and asset sales. This is comparable with \$6.7 billion from these sources committed in the last capital program, which included \$1.3 billion from the federal government for Lower Manhattan but did not include one-time payments assumed for the sale of assets such as the Hudson and Atlantic Yards that are being discussed as part of redevelopment proposals for the Far West Side of Manhattan and Downtown Brooklyn. These

Funding Gap for Core Program:

State of Good Repair, Normal Replacement, and System Improvement (in billions of \$)

Five Year Need	18.900
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Revenue Assumptions

Federal Contributions to Core Program	4.770
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MTA Program and Investment Income	.300
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Asset Sales (West Side Yards, Atlantic Yards, other)	1.000
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Reprogram LaGuardia funds	.345
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Total	6.420
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Five Year Gap	(12.480)
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Annual Gap	(2.497)
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Funding Gap for Expansion Projects

(in billions of \$)

Project Costs

Second Avenue Subway, Phase 1	2.800
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Second Avenue Subway, Phase 2	1.00
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East Side Access	3.800
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Total	7.600
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Five Year Gap, assuming 50% federal share	(3.800)
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Annual Gap, assuming 50% federal share	(.760)
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Five-Year Gap, assuming 25% federal share	(5.700)
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Annual Gap, assuming 25% federal share	(1.140)
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assumptions also include \$345 million that was contained in the last plan for a connection to LaGuardia Airport that is no longer being considered. The remaining \$12.5 billion, or \$2.5 billion per year, will need to come from state and local subsidies, bonding backed largely by farebox revenues, or new revenue sources.

The state and local funding required for the \$7.6 billion in expansion projects could fall within a fairly wide band, depending on how much is committed to each project in the New Starts program when five-year federal transportation funding is reauthorized. A high estimate of a 50% federal match would require \$760 million per year from local sources, while a 25% match would require \$1.1 billion annually.

Therefore, the annual funding need for both the core program and expansion projects could be as high as \$3.6 billion per year. However the gap is funded, it is clear that it cannot be financed with the extraordinary amount of debt that was used

to pay for the last capital program. In 2000-2004, 23% was accounted for from debt restructuring that relied on a highly favorable interest rate climate that is unlikely to be repeated. Another 36% was financed by bonds backed by revenues normally used for operating revenues, primarily transit fares.

The greater reliance on internal resources for the capital program actually began in the 1990s, when both New York State and New York City greatly reduced their support for the capital program. As shown below, while state and local subsidies provided nearly 30% of program costs in the 1980s, they declined to 2% for New York City and 0% for New York State in the last capital program. The next capital program needs to return to reasonable levels of state and local subsidy and debt financing.

The next five years should be seen as a transition period in which sustainable, long-term financing is identified for both continued state-of-good-repair projects, a normal replacement cycle and network expansion needs. This financing structure will need to include the following reforms.

New York State, New York City and the suburban counties will need to substantially increase their support for the capital program. With no likelihood for debt refinancing and limited capacity to absorb additional debt, it will be impossible for the MTA to fund a capital program that even approaches the level of need without increased state and local subsidy. Both State and City subsidies have fallen dramatically since the first capital plan. State contributions fell from 19% of the 1982-1986 capital plan to \$0 in the 2000-2004 plan. City subsidies have ranged from 15% of the capital plan (1987-1991) to only 2% in the last capital plan, when the City contributed \$451 million over five years.

2000-2004 Capital Plan (in millions)

Federal (includes Lower Manhattan)	\$6,208	32%
Program and Investment Income	328	2
Asset Leasing	173	1
Debt Restructuring	4,505	23
Bonds	6,979	36
City of New York	451	2
Insurance Recovery for WTC damage	212	1
Other	479	3
Total	19,335	100

*This table excludes \$1.028 billion for Bridges and Tunnels.

Debt financing and the operating deficit need to be considered concurrently, and the state has to dedicate long-term subsidies to rationalize the MTA's financial structure. Debt financing cannot be avoided entirely for this plan, but it needs to be limited and incorporated into a strategy to resolve the operating deficit. The February 2004 MTA Financial Plan projects the operations budget gap at \$539 million for 2005, \$1.2 billion for 2006, and \$1.3 billion for 2007. A sustainable strategy would incorporate increased and sustained levels of state subsidy and reasonable levels of fare and toll revenues. Over the last 15 years, the State has funded between 3 and 5% of the operating budget each year; in 2002, State subsidies accounted for 3% or \$230 million of the \$7.6 billion operating budget. The case for increased subsidy can be made on both economic and equity grounds. The MTA region generates 75% of the wages earned in New York State and a similarly high share of state tax revenues. Without a strong underpinning from the MTA transit network, the state's economic engine could be jeopardized. New York City subway and bus riders also pay for a much higher share of operating costs through the farebox than most other transit systems already, and without additional state support this gap will grow considerably larger.

New, dedicated revenue sources will be needed for expansion projects. Expansion projects such as the full-length Second Avenue Subway and East Side Access take more than 5 years to complete, and should logically be funded with sources that would be dedicated to them for the life of the construction period. Expansion projects benefit the economy and tax revenues. The Second Avenue Subway, for example, will result in time savings valued at \$1.2 billion per year that will aid business productivity and attractiveness. Funding it and other expansion projects with dedicated, stable revenue sources will minimize competition with funding sources for operating revenues and state of good repair/normal replacement commitments. It will also eliminate the risk that partially completed projects will need to be abandoned if funding cannot be sufficiently cobbled together with each five-year capital plan.

MTA Capital Plan (in percent)

	1982-1986	1987-1991	1992-1999	2000-2004
Federal	28	25	32	32
State	19	14	5	0
City	7	15	9	2
Bonds & Debt Restructuring	32	25	40	59
Other	14	21	15	6

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Employment Graph: US Bureau of Labor Statistics

All photos: www.subwaywebnews.com

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Regional Plan Association (RPA) is an independent regional planning organization that improves the quality of life and the economic competitiveness of the 31-county New York-New Jersey-Connecticut region through research, planning, and advocacy. Since 1922, RPA has been shaping transportation systems, protecting open spaces, and promoting better community design for the region's continued growth. We anticipate the challenges the region will face in the years to

come, and we mobilize the region's civic, business, and government sectors to take action.

RPA's current work is aimed largely at implementing the ideas put forth in the Third Regional Plan, with efforts focused in five project areas: community design, open space, transportation, workforce and the economy, and housing. For more information about Regional Plan Association, please visit our website, www.rpa.org.

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